

Authors

Martin Beckerman

B.S., 1956; M.S., physics, 1959, Tulane University. While in graduate school, he held a graduate teaching assistantship in physics and a research assistantship. He was engaged in research for the Kalvar Corporation, New Orleans, in unconventional photography. Joined IBM Federal Systems Division, Kingston, in 1959. Worked initially on magnetic thin-film display and is presently engaged in thin-film resistor technology. Member of Sigma Pi Sigma.

Klaus H. Behrndt

Diploma in Physics, University of Cologne, Germany, 1952. Dr. rer. nat., (Physics), School of Mines, Clausthal, Germany, 1954, where he was research assistant and instructor until 1956; from 1951 to 1954, he investigated the influence of external dc magnetic fields on the direction indicated by gyrocompasses; from 1954 to 1956, he worked on the construction of a microbalance for use in ultra-high-vacuum system and thin-film work. In 1957 Dr. Behrndt worked at MIT Lincoln Laboratory, where he was engaged in the investigation of ferromagnetic films. He joined IBM Federal Systems Division, Kingston, in the same year. Worked on ferromagnetic films and their technology and on vacuum problems. Member American Physical Society, American Vacuum Society, and German Physical Society.

Marianne E. Behrndt

Ph. D., 1954, Humboldt University, Berlin, Germany; instructor at Humboldt for one year, supervising experimental work of graduate students. February 1955, joined the Telephone Company in Ulm, Germany, working on the development of microwave tubes. In February, 1957, Dr. Behrndt joined Lincoln Laboratory, working experimentally in the field of cyclotron resonance. Joined IBM Federal Systems Division, Kingston, in February 1958 as a consultant, working on the properties of evaporated superconducting films for device application in the Low Temperature Development Group. The main interest was in structure of such films. Is a member of the German Physical Society.

Rex H. Blumberg

B.S.E.E., University of Kansas, 1956; presently enrolled in Syracuse University Graduate Program. Joined IBM in 1956 and is now engaged in cryogenic thin-film studies at the Federal Systems Division Development Laboratory, Kingston. Member of Tau Beta Pi, Eta Kappa Nu, Sigma Tau, Sigma Pi Sigma.

Edward L. Boyd

B.A., Lehigh University 1954. Joined IBM Poughkeepsie Research Center in 1955 and is presently engaged in research into the magnetic properties of metals. Member of American Institute of Physics.

Andrew E. Brennemann

B.S. in E.E., 1949; M.S. in E.E., 1950, University of Cincinnati. Joined IBM in June 1950, and worked on the electrostatic storage system of the IBM 701 and later the barrier grid tube storage system of the IBM 770. Worked in the ferroelectric device area and is presently working in cryogenics at the Poughkeepsie Research Center. Member of Tau Beta Pi and Eta Kappa Nu, and a member of the IRE.

Hollis L. Caswell

B.A. in Physics, Carleton College, 1953; M.S., Cornell University, 1955; Ph.D. in Engineering Physics, Cornell University, 1958. Joined IBM in 1957 and is studying the cryogenic properties of thin films at the Poughkeepsie Research Center. He is a member of the American Physical Society and Sigma Xi.

Ralph B. DeLano, Jr.

B.S. in E.E., Massachusetts Institute of Technology, 1941. Graduate work at Stevens Institute of Technology and other universities. Worked at Sperry Products, Inc., 1941 to 1948, on flaw detection problems and was in charge of ultrasonic research. Joined IBM in 1949 where he has been in charge of groups working on storage tube and ferroelectric research and development. Mr. DeLano is presently directing a group at the Poughkeepsie Research Center working on cryogenic device technology and systems. Member IRE and AIEE. Is a licensed professional engineer.

Wolfgang Dietrich

Diploma in Electrical Engineering, Institute of Technology Darmstadt, Germany, 1952. From 1952 to 1956 he participated in the construction of the electronic computer DERA at the Institute of Applied Mathematics, Darmstadt, Germany. Joined IBM in 1956 as an Associate Engineer in the Research Laboratory, Zurich, where he is engaged in investigating the switching properties of thin magnetic films. Member of the German Nachrichtentechnische Gesellschaft (NTG).

Erich Erlbach

A.B. in Physics, with highest honors at Columbia College, 1955; A.M., Columbia University, 1957; candidate for Ph.D. in Physics at Columbia University, 1960. Mr. Erlbach was teaching assistant, Columbia University, 1955 to 1957; Lecturer in Physics, CCNY, evening session, 1957 to 1959. Has been research assistant at IBM Watson Laboratory since 1957. Is member of the Phi Beta Kappa and the American Physical Society.

James F. Freedman

B.E. in Metallurgy, 1955; M.E. in Physical Metallurgy, 1956; Dr. Eng. in Physical Metallurgy, 1960, Yale University. Joined IBM in 1959 and is engaged in magnetism research at the Poughkeepsie Research Laboratory. Is member of Tau Beta Pi, Sigma Xi, American Society of Metals, and American Institute of Metallurgical Engineers.

Allen N. Friedman

B.S. in Physics, City College, City of New York, 1956; M.A. in Physics, Yale University, 1958; presently attending Columbia University. Appointed as research assistant at IBM Watson Laboratory in 1957 to do thesis research. Member of the American Physical Society and its Solid State Division, and of Phi Beta Kappa.

Richard L. Garwin

B.S. in Physics, Case Institute of Technology, 1947; M.S. in Physics, 1948; and Ph.D. in Physics, 1949, University of Chicago. Joined IBM in 1952 and has been working on liquid helium, superconductors and superconducting devices, mesons and parity, at IBM Watson Laboratory. Fellow, American Physical Society.

Gary R. Giedd

B.S. in Physics, Augustana College, 1955; graduate work at Kansas State College and Columbia University. Research assistant in gaseous discharge phenomena at Kansas State College. Presently enrolled in Syracuse University Graduate School. Mr. Giedd joined IBM in 1956 and was engaged in cryogenic thin film technology at the Federal Systems Division Development Laboratory, Kingston. Is a member of the IRE and the American Physical Society.

Frank S. Ham

A.B., 1950; Ph.D. in Physics, 1955, Harvard University. Was National Research Council Postdoctoral Fellow at University of Illinois, 1954-1955. Since 1955 Dr. Ham has been Research Associate at the General Electric Company Research Laboratory, engaged in research in solid state physics. Is a member of American Physical Society.

George J. Kahan

Dr. rer. nat., German University in Prague, Czechoslovakia, 1938. Postgraduate research under J. Heyrovsky at Charles University, Prague, 1939. Postgraduate research under I. M. Kolthoff, University of Minnesota, 1940 to 1942. Electrochemical research at Chromium Corporation of America, 1942 to 1945. Metallurgical and physical-chemical research and development at U. S. Time Corp., 1945 to 1949. Research Associate and Lecturer at University of Cincinnati, 1950 to 1951, working on physical properties of liquid metals. Sprague Electric Co., 1951 to 1954, physical-chemical research in the field of electronic components. Aircraft industry engineering and development work in materials engineering, 1954 to 1957. Joined IBM Poughkeepsie Research Center, 1957, in the Cryogenics Department, working on the properties of thin films. Member, American Chemical Society and RESA.

Seymour H. Koenig

B.S., 1949; M.A., 1951; Ph.D. in Physics, 1952, from Columbia University. Assistant in Physics, 1949-51; AEC Pre-Doctoral Fellow, 1951-2. Joined IBM Watson Laboratory, March 1952. Work mainly on low temperature electrical transport in semiconductors and semimetals. Adjunct Associate Professor of Electrical Engineering, Columbia University. Member of Sigma Xi; Fellow, American Physical Society. Consultant to Los Alamos Scientific Laboratory.

Jack D. Kuehler

B.S. in Mechanical Engineering, University of Santa Clara, 1954; presently working toward M.S. in Electrical Engineering. Was employed as a design engineer with General Electric Aircraft Nuclear Propulsion and Gas Turbine Division, 1954-1955; attended Army School of Nuclear Physics, and subsequently worked as Depot Supervisor for a U.S.A. Ordnance Special Weapons Depot, 1955-1957. Joined IBM Research Laboratory at San Jose in 1958, where his principal field of interest has been in electron physics and related devices. Is presently working in the Display Components Group in the Advanced Systems Development Laboratory in San Jose.

Daniel C. Mattis

B.S., MIT, 1953. Studied physics at the University of Illinois in Urbana, obtaining Ph.D. in 1957. Thesis under Professor J. Bardeen, on the quantum theory of ac conductivity. Spent a year at the Ecole Normale Supérieure in Paris in a group headed by Pierre Aigrain, under a grant from the CNRS, before joining IBM. Since then, has been a member of the Physics Department in the Poughkeepsie Research Center specializing in various problems of solid state physics. Member of American Institute of Physics, American Physical Society and Sigma Xi.

Siegfried J. Methfessel

M.S. in Physics, University of Halle, Germany, 1950; Ph.D. in Physics, Technical University of Clausthal, Germany, 1955. Dr. Methfessel worked there on the emission of photoelectrons from thin films. Joined IBM in 1957 in charge of basic physical research on thin magnetic films at the Research Laboratory, Zurich. Member of the Swiss Physical Society and of the German Physical Society.

Simon Middelhoek

M.S. in Physical Engineering, Technical University of Delft, Holland, 1956. Joined IBM in 1956 as physicist in the Research Laboratory, Zurich. He is engaged in the investigation of the physical properties of thin ferromagnetic films. Member of the Dutch Physical Society and the Society of Engineers of Delft.

Peter J. Price

Studied physics at Oxford and Cambridge Universities, obtaining a Ph.D. in theoretical physics from the latter in 1951. Subsequently research assistant to the late Fritz London at Duke University, and a member of the Institute for Advanced Study at Princeton, before joining IBM in 1953. Since then he has been a member of the physics group of Watson Research Laboratory at Columbia University. His principal field of research is solid state physics.

Walter E. Proebster

M.S. in Electrical Engineering, Institute of Technology, Munich, Germany, 1951; Ph.D. Degree in Electrical Engineering, Institute of Technology, Munich, Germany, 1956. From 1951 to 1956 he was associated with the Department of Electrical Communications at the Institute of Technology, Munich, charged with the development of the electronic circuits of the computer "PERM." Joined IBM in 1956 as project manager in charge of research on switching circuits and thin magnetic films, at the Research Laboratory, Zurich. He is an Associate of the American Institute of Radio Engineers, and a member of the German Nachrichtentechnische Gesellschaft and of the Swiss Society of Automation.

Emerson W. Pugh

B.S., Carnegie Institute of Technology, 1951; Ph.D. in Physics in 1956, Carnegie Institute of Technology. Was Assistant Professor of Physics at Carnegie Institute, 1956-57; co-author of *Principles of Electricity and Magnetism*, Addison-Wesley, 1960. Major fields of research are magnetic properties of metals and dilute alloys. Currently head of Metal Physics Group in the Magnetism Department, Poughkeepsie Research Center. Is a member of American Physical Society, Research Society of America, Sigma Xi, Pi Mu Epsilon, and Tau Beta Pi.

Myriam P. Sarachik

A.B. in Physics, cum laude, at Barnard College, 1954; M.A., Columbia University, 1957; candidate for Ph.D. in Physics at Columbia University, 1960. Has been research assistant at Watson Laboratory since 1955. Is member of Phi Beta Kappa, Sigma Xi and American Physical Society.

Robert S. Smith

B.S. in Physics, Duke University, 1945. Ph.D. in Physics, University of Pennsylvania, 1955. Had been employed by Philco Corporation and the Franklin Institute. Joined IBM Poughkeepsie Research Center in 1956. Present field of interest is electroplated magnetic films. Member, Sigma Pi Sigma, Electron Microscope Society.

Harry Thomas

M.S. in Physics, University of Rostock, Germany, 1950; Ph.D. in Physics, Bergakademie (Technical University) Clausthal, Germany, 1956. From 1950 to 1956, teaching and experimental studies of photoelectric emission and optical and electrical properties of thin alkali films at the Department of Physics, Bergakademie, Clausthal. From 1956 to 1958, teaching and theoretical work on low temperature physics at the Department of Theoretical Physics, University of Mainz, Germany. Joined the technical staff of the IBM Research Laboratory, Zurich, in 1958 as Theoretical Physicist, and is engaged in theoretical studies of ferromagnetism. Member of the German Physical Society.

Robert T. C. Tsui

B.S. in Engineering Physics, University of Illinois, 1957. Joined IBM in 1957 in the Cryogenics Department at the Poughkeepsie Research Center and worked on thin-film cryotrons. Is now at Cornell University on leave of absence from IBM.

Michael Satoshi Watanabe

Dr. Sc., University of Paris, 1935. Was Professor of the U. S. Naval Postgraduate School at Monterey, California, 1952-56. Joined IBM in 1956 at the Poughkeepsie Research Center, where he worked primarily on information theory. Is presently associated with the Lexical Processing Research Department at the Yorktown Heights Research Center. During this academic year he is teaching a course in information theory at Yale University Graduate School. Is Fellow of the American Physical Society and a member of Sigma Xi.

Peter Wolf

Diploma in Physics, Institute of Technology, Darmstadt, Germany, 1958. From 1958-1959 he was assistant in Physics at the same Institute, engaged in research on thin films. In 1959 he joined IBM as an Associate Physicist in the Research Laboratory, Zurich, where he is working on the investigation of dynamic properties of thin magnetic films. He is a member of the German Physikalische Gesellschaft.

Contents of Previous Four Issues

April 1959

Vol. 3, No. 2

● Articles

- Direct Measurement of the Angular Dependence of the Imaginary Part of the Atomic Scattering Factor of Germanium
by *L. P. Hunter* 106-113
- Finite Automata and Their Decision Problems
by *M. O. Rabin and D. Scott* 114-125
- Interatomic-Force Constants from a Central-Force Law
by *H. Cole* 126-131
- On the Transition from Superconducting to Normal Phase, Accounting for Latent Heat and Eddy Currents
by *A. J. W. Duijvestijn* 132-139
- Geometric Effects in the Superconducting Transition of Thin Films
by *M. D. Reeber* 140-146
- Computation of $\sin N$, $\cos N$ and $\sqrt[m]{N}$ Using an Electronic Computer
by *E. G. Kogbetliantz* 147-152
- Microwave Resonance in Gadolinium-Iron Garnet Crystals
by *W. V. Smith, J. Overmeyer and B. A. Calhoun* 153-162
- On Codes for Checking Logical Operations
by *W. W. Peterson and M. O. Rabin* 163-168
- Extension of Moore-Shannon Model for Relay Circuits
by *M. Kochen* 169-186

● Short Communications

- Numerical Solution of Laplace's Equation, Given Cauchy Conditions
by *I. Sugai* 187-188
- A Cryogenic Oscillator
by *G. B. Rosenberger* 189-190
- Noise Theory for Hot Electrons
by *P. J. Price* 191-193
- Doubling the Efficiency of the Load-Sharing Matrix Switch
by *M. P. Marcus* 194-196
- Elementary Divisors of Normal Matrices
by *P. Erdős* 197
- The Reduction of Two-Way Automata to One-Way Automata
by *J. C. Shepherdson* 198-200

July 1959

Vol. 3, No. 3

● Articles

- Some Studies in Machine Learning, Using the Game of Checkers
by *A. L. Samuel* 210-229
- Some Properties of Experimental 1000-Mc Transistors
by *R. F. Rutz and D. F. Singer* 230-236
- A Gas Film Lubrication Study, Part I: Some Theoretical Analyses of Slider Bearings
by *W. A. Gross* 237-255
- A Gas Film Lubrication Study, Part II: Numerical Solution of the Reynolds Equation for Finite Slider Bearings
by *W. A. Michael* 256-259
- A Gas Film Lubrication Study, Part III: Experimental Investigation of Pivoted Slider Bearings
by *R. K. Brunner, J. M. Harker, K. E. Haughton and A. G. Osterlund* 260-274
- Experiments on the Relation of the Operator to the Control Loop of an Airborne Digital Computer
by *C. A. Bennett* 275-281
- A Learning Machine: Part II
by *R. M. Friedberg, B. Dunham and J. H. North* 282-287
- Indexing and Control-Word Techniques
by *G. A. Blaauw* 288-301